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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/693,584

10/24/2003

Baiyi Zhao

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1077

23455 7590 02/22/2008  
EXXONMOBIL CHEMICAL COMPANY  
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EXAMINER

MCDONOUGH, JAMES E

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

02/22/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/693,584	<b>Applicant(s)</b> ZHAO ET AL.	
	<b>Examiner</b> JAMES E. MCDONOUGH	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-6 and 9-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-6 and 9-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-6 and 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwald (USP 6,307,087) in further view of Qian et al. "Synthesis and Polymerization Behavior of Various Substituted Half-Sandwich Titanium Complexes Cp'TiCl<sub>2</sub>(OR\*) as Catalyst for Syndiotactic polystyrene"; J. Mol. Cat.; 208; 2004, 45-54.

Buchwald substantially discloses the invention as claimed (col. 7, 1. 5-44; col. 14, 1. 1-18; col. 31, 1. 40 to col. 32, 1. 32).

The abstractable ligands in the primary reference are halogen, however, because Qian teaches in catalyst complexes used for polymerizing olefins that it is obvious to

Art Unit: 1793

substitute halogen ligands for hydrocarbyl ligands and vice versa as it is known these changes will provide a change the activity of the catalyst and the properties of the polymer produced (see entire article, especially abstract) and teaches that by changing the  $\sigma$ -donation ability of the abstractable ligand the reactivity of the metal can be controlled (results and discussion) and one skilled in the art would expect a change in  $\sigma$ -donor ability as we go from halogen (F, Cl, Br, I, At) to chalcogen (O, S, Se, Te, Po) to pnictogen (N, P, As, Sb, Bi) to carbon as the donor atom, it would have been prima facie obvious to someone of ordinary skill in the art at the time the invention was made to modify the teachings of the primary reference, by substituting halogen ligands for hydrocarbyl ligands, as suggested by Qian.

### **Response to Arguments**

Applicants argue with respect to the 102 rejection over Buchwald. These arguments are found persuasive therefore, they have been withdrawn.

Applicants argue with respect to the double patenting rejection. These arguments have been found persuasive therefore, they have been withdrawn.

Applicants argue against the 103 rejection of Buchwald. These arguments have been fully considered, but are not persuasive.

Applicants argue that examiner's assertion that the reference shows that it would be obvious to substitute a hydrocarbyl ligand for a halogen ligand is an overstatement and incorrect, as halogen ligands are polar and carry a different charge than hydrocarbyl ligands, and therefore are not equivalent. Examiner respectfully disagrees with applicants for at least the following reasons: 1.) In organometallic/coordination chemistry both hydrocarbyl and halogen ligands carry a negative 1 charge. 2.) both hydrocarbyl and halogen ligands are polar on a metal center only hydrocarbyls are  $\sigma$ -donating halogens are  $\sigma$ -withdrawing 3.) While hydrocarbyls and halogens will act differently in their tug of war for electrons with the metal center, these interactions are well understood and can and are used regularly to "tune" the activity of a particular metal system 4.) And since there are indeed a limited number of main group elements to bind to a metal center and halogens and hydrocarbyl among some of the most frequently used and interchanged (they carry the same unit charge and substituting one for another does not change the oxidation state or electron count the metal center) one skilled in the art would be motivated to exchange one group for another to "tune" the activity through routine experimentation to optimize the electronic character of the metal center depending on the desired application and therefore, if it was desired to increase or decrease the electron density at the metal center. 5.) Since neither halogen nor hydrocarbyl ligands are strong field ligands one would not expect any change in the orbital or geometric configuration, but simply a slight change in the  $\sigma$ -donation that can be adjusted by going from methyl to secondary to tertiary hydrocarbyls to halogens and from fluorine to iodine to finely "tune" the metals activity.

Applicants argue that one would not be motivated to look at the reference because they use group 4 metals and the instant invention uses group 8-10 metals and the later transition metal complexes are harder to make. This is not persuasive for at least: 1.) Being allegedly harder to synthesize does not mean one skilled in the art would not look to other reference for knowledge, as many metal alkyl are difficult to synthesize without appropriate protocols work out for their synthesis and most all are extremely air/moisture sensitive. 2.) If later transition metal alkyls are so difficult to synthesize why is diethyl zinc commercially available at low cost? And commonly used to test inert atmospheres? 3.) The references are both directed towards using metal catalyst for polymerization and one skilled in the art would certainly look to other examples in the art for ways to tune the metal center even if they are using different metals as certain changes i.e. from hydrocarbyl to halogen have predictable effects on the electronic of the metal center.

### Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 1793


mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES E. MCDONOUGH whose telephone number is (571)272-6398. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JEM 2/14/2008      /Jerry A Lorengo/  
Supervisory Patent Examiner, Art Unit 1793

<div>Application Number</div> <div></div>	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/693,584	ZHAO ET AL.	
	Examiner	Art Unit	
	JAMES E. MCDONOUGH	1793	